A New Model for:

Sustainable Energy Services and Economic Development in Off-Grid Communities

Robb R. Walt, President

Community Power Corporation (CPC)

Village Power 2000

World Bank December 2000

Community Power Corporation

Energy Systems for Sustainable Development

Developing New *Commercial Models* and *Technologies* For Sustainable Energy Services and Economic Development in Off-Grid Communities

Community Power Corporation

Energy Systems for Sustainable Development

Our Mission and Vision

Community Power Corporation designs and delivers high-value energy-related products and services to improve the social, economic and environmental conditions of the more than two billion people in the world who lack access to modern energy services.

Our vision is to be a global leader in providing affordable, environmentally-friendly, distributed power generation products that use renewable energy.

Community Power Corporation

Energy Systems for Sustainable Development

- Founded by Robb Walt and Art Lilley in 1995 following 20+ years with Westinghouse – Advanced Energy Systems and International Projects

- Goal: Apply a decade of experience in renewable energy technologies and two decades of experience in developing countries to find solutions to sustainable generation and delivery of modern energy services on a market-driven basis

- Accomplishments:

  First PV/Hybrid village power projects in Torres Strait, Mexico, Indonesia, Philippines

  First private sector “Fee-For-Service” village power projects in Indonesia and the Philippines (Business Plan, Electrification Plan, Power Systems, Training)

  First fully automated Small Modular Biopower System for village power

  First wood-gas “Turbo Stove” to solve chronic health problems for women and children due to indoor air pollution

CPC's Product Development Facility

Near Denver, Colorado (20 minutes to NREL)

A New Facility for Product Design, Engineering, Fabrication and Testing

CPC's Technologies and Products Support Sustainable Development

UtiliMeter (2 Models)

Small Modular Biopower Systems

Small PV-LPG Hybrids

Biomass Stirling Battery Charger

SMB Powered Mini Coconut Oil Mill

Turbo Stove

CPC's Technologies Make Life Better

Quality of Life → **Electricity** (households, enterprise, schools, clinics, etc.)

Efficient, healthy cooking

Economy of Life → **Electricity & Heat for livelihood projects**

Access to markets

Quality of Environment → **Use renewable energy** ← Sun, Ag residues, Wind

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Shell

New Market Driven Technologies:

- Small Modular Biopower Systems
- Pre-payment energy service meters
- Bio-Stirling power systems
- Bio-Fuel Cell Home Power Systems

New Commercial Models:

- Private sector investments
- Fee-for-service
- Public/private sector partnerships

New Markets for Renewable Energy Technologies:

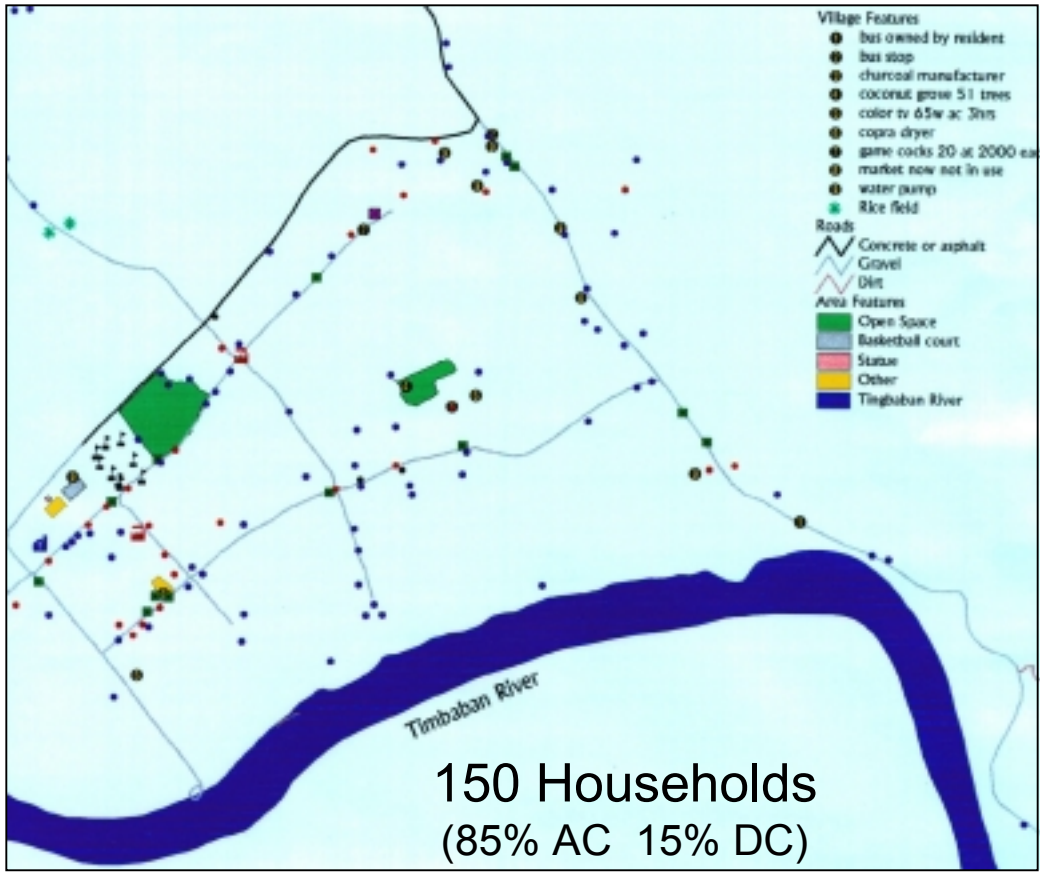
• Off-Grid Rural Electrification	Philippines
• Distributed Generation	California, New York

World's First IRES* Community – Alaminos

RESCO, AC & DC Services, Livelihood Projects, Partnerships (Shell & CPC)

Philippines

Alaminos



* Integrated Rural Energy Services

World's First IRES* Community – Alaminos

RESCO, AC & DC Services, Livelihood Projects, Partnerships (Shell & CPC)

Main Street

Alaminos Family

PV/LPG Hybrid Power System

Typical House

Agreement with Community Leader

Alaminos Livelihood Projects

Objective: Use R.E. to substantially increase economy of community

Projects:

Small Coconut Oil Mill

Soap Making

Geo-textiles

- Coir Nets
- Pina Cloth

Market Locally to Tourists and Globally on Internet

Napsan Livelihood Projects

Projects:

- Cashew Drying
- Kerogin (seaweed)
- Mariculture
- Cold Storage
- Ice Making
- Geo-textiles
  - Coir Nets
  - Pina Cloth

Electricity & heat from CPC's Small Modular Biopower System

Components For Sustainable, Private Sector-Driven Rural Electrification

RESCO:* **Fee-For-Service, Market Price, Willingness and Ability to Pay, Renewable Energy, BOO**

Livelihood Projects: **New power, new capital, new technology, new enterprises, and mew markets for new and existing local products**

Partnerships: **Key roles for entrepreneurs, community leaders, mayors and governors, government agencies, utilities, banks, NGOs, investors, customers, development organizations**

* Rural Energy Services Company

CPC's RESCO Model

- Serve all customers in a geographic area - build a service territory, build business density, build loyalty
- Use mix of most appropriate renewable energy technologies (AC, DC, Solar, Biomass, Wind)
- Meet each customer's priority energy requirements with reliable, hassle-free, clean and efficient electricity services
- Charge customers less than what they now pay for inferior energy services from kerosene, batteries, small gensets, candles.

CPC's RESCO Model

- Sell energy services – fees, not kWh rates
- Provide customers service, without technology risk
- Use modular/transportable R.E. power systems
- Establish local service infrastructure
- Share capital costs with local/national government, development organization

Cooking Smoke: Silent Killer In Developing Countries

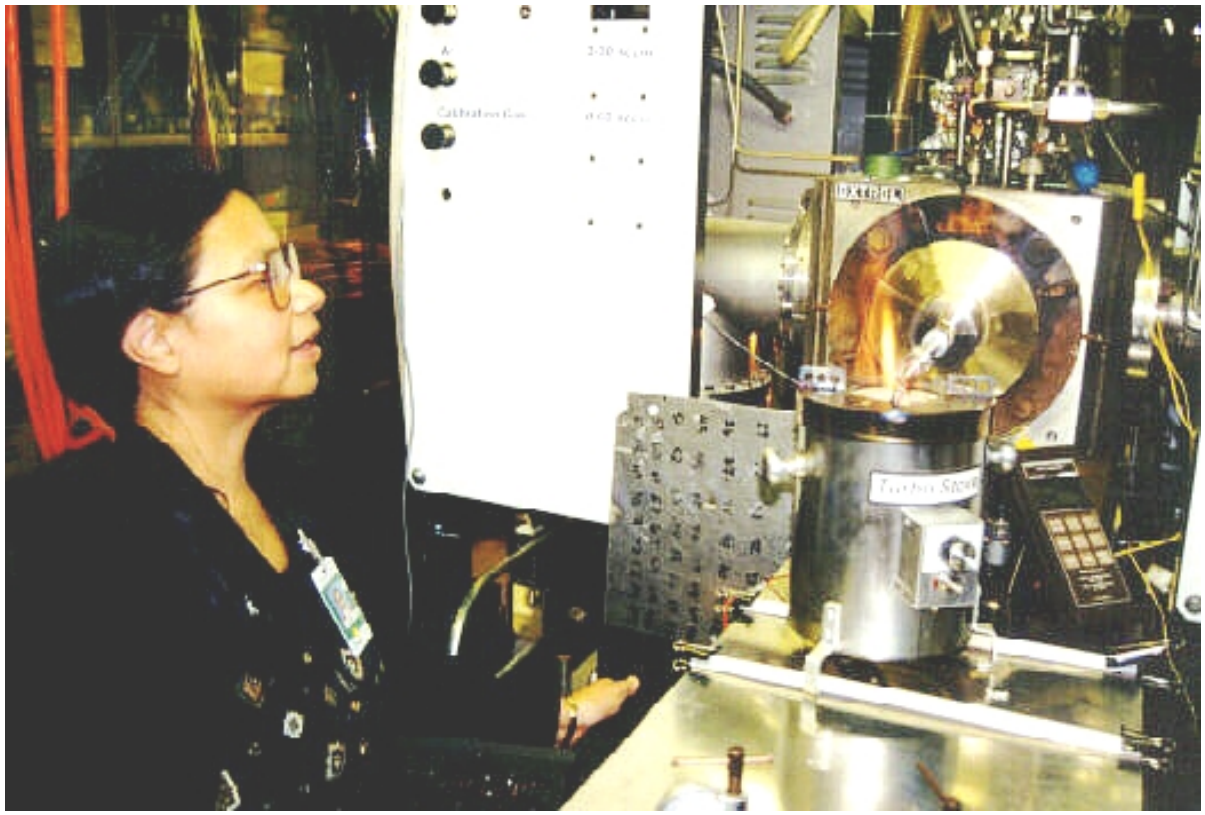
2 million people die each year from inhalation of smoke from cooking fires.

Deaths from indoor air pollution exceed deaths from tuberculosis, malaria or AIDS.

In India alone, 500,000 women and children die each year from cooking smoke.

World Health Organization (1996)

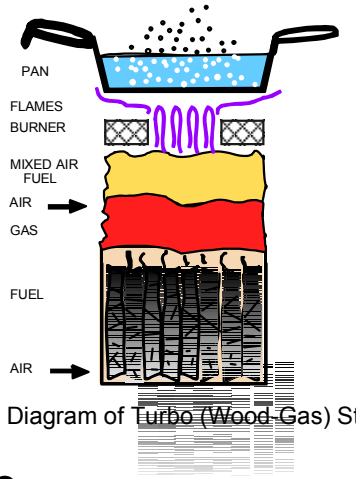
CPC New Turbo Stove Under Test
At the National Renewable Energy Laboratory
Golden, Colorado



Dr. Helena Chum, Director Bioenergy Division
US National Renewable Energy Laboratory

CPC's NEW TURBO WOOD-GAS STOVE

A Bioenergy Innovation From Community Power Corporation



Simple Diagram of Turbo (Wood-Gas) Stove

Prototype CPC Turbo (Wood-Gas) Stove Under Test

Traditional 3 Stone Stove

- Burns mainly wood
- Smoky - harmful to health
- Bottom up burning
- Partial combustion
- Hard to start
- Difficult to control heat
- Many tars and dirty pots
- Rapid fuel consumption
- Hard to save charcoal
- Very low cost
- Low maintenance

New "Smoke-Free" Turbo Stove

- Burns most kinds of biomass
- Complete combustion, much higher efficiency
- Easy to start and control heat
- Smokeless - not harmful to health
- Very few tars - much cleaner pots
- Similar to bottled gas stove
- A little higher cost, but still affordable by most
- Low maintenance
- Requires 2 watts of electricity
  or mechanical wind-up
- Designed to compliment PV Solar Home Systems

CPC's Prototype Turbo Stove Is Ready for Field Trials

Turbo Stove Demonstration at CPC

First Field Trial of Turbo Stove In Indian Village